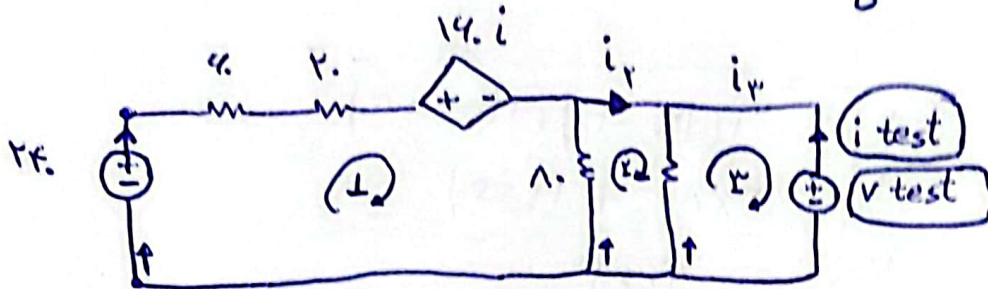


معادله نوشتن باید.



$$KVL: -24 + 4i_1 + 2i_1 + 14i + 8i_1 - i_p = 0$$

$$\text{مس 1} \quad 14i_1 - 8i_p = 24 - 14i_p + 14i_p \Rightarrow 4i_1 + 2i_p = 24 + 4i_p$$

$$\text{مس 2} \quad 8(i_p - i_1) + 4i = 0 \quad 8i_p - 8i_1 + 4i_p - 4i_p = 0$$

$$12i_p - 8i_1 - 4i_p = 0$$

$$2i_1 - 2i_p - i_p = 0$$

$$2i_1 + i_p = 24 + 2i_p$$

$$\text{مس 3} \quad 4(i_p - i_1) + v_{test} = 0$$

$$i_p = 2i_1 - i_p$$

$$2i_1 + i_p = 24 + 4i_p - 4i_1 \Rightarrow 4i_1 = 24 + 3i_p$$

$$2i_1 - 2i_1 - i_p = -v_{test}$$

$$v_{test} = -2i_1 + 2i_1$$

$$i_{test} = -i_p$$

$$r i_1 + i_r - r i_r = r$$

$$-r i_1 + r i_r - i_r = 0$$

$$0 i_1 - r i_r + r i_r = -V_{test}$$

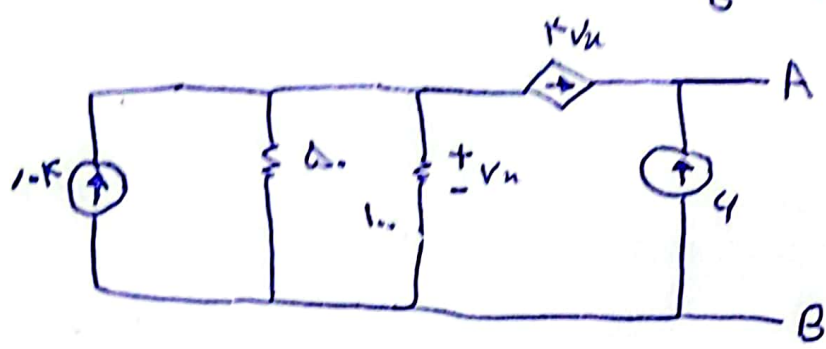
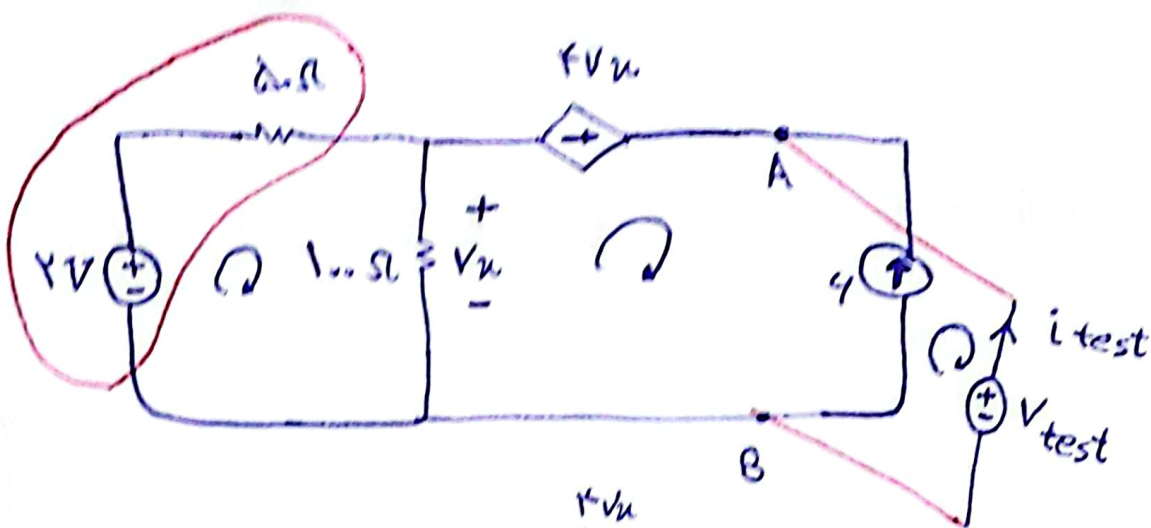
$$i_r = \frac{\begin{vmatrix} r & 1 & r \\ -r & r & 0 \\ 0 & -r & -V_{test} \end{vmatrix}}{\begin{vmatrix} r & 1 & -r \\ -r & r & -1 \\ 0 & -r & r \end{vmatrix}} = \frac{+r_0(\Lambda_0) - (V_{test})(\Lambda)}{r(r_0 - r_0) + r(r_0 - \Lambda_0)} = \frac{r \times \Lambda_0 + r(-r_0)}{r \times r} =$$

$$i_r = \frac{\Lambda(r_0 - V_{test})}{\Lambda_0} = \frac{r_0 - V_{test}}{19}$$

$$-i_r = i_{test} = i$$

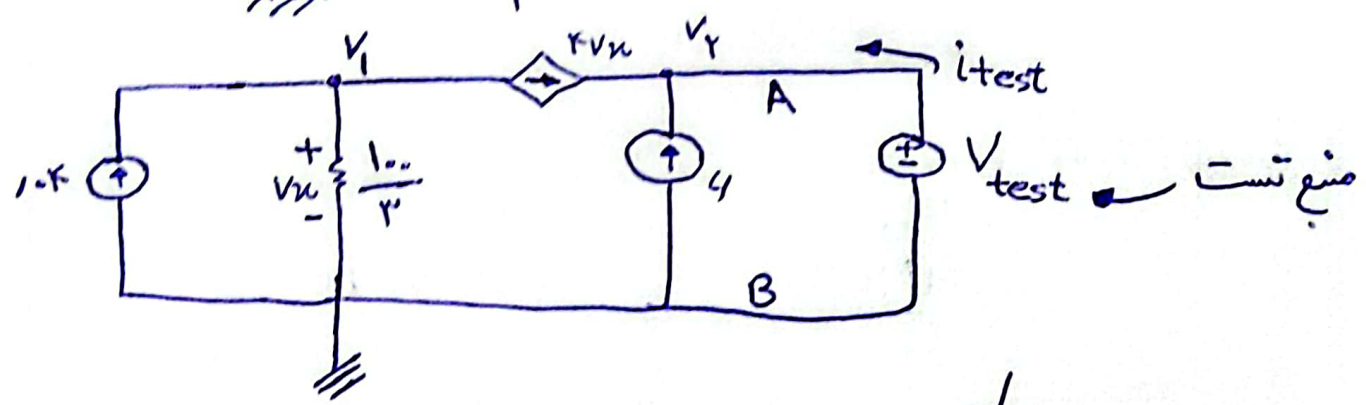
$$\frac{V_{test} - r_0}{19} = i$$

$$\underbrace{1 \cdot i}_{R_{th} \quad 1. \Omega} + \underbrace{r_0}_{V_{th} \quad r. \nabla} = V_{test}$$



ولتاژ تونن = ?
مقاومت تونن = ?

مقاومت $\frac{100 \times \cancel{100}}{\cancel{100} + \cancel{100}} = \frac{100}{2}$



$$KCL_{V_1} = -10k + \frac{3V_1}{100} + 4V_x = 0$$

$V_x = V_1$ طبق سئال
 V_1

$$V_2 = -4V_x - i_{test} - 4 = 0$$

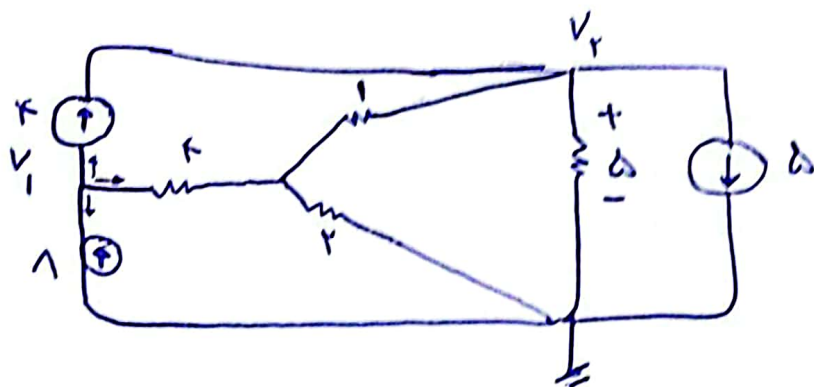
$$\frac{4 \times 3 V_1}{100} = \frac{4}{100} \quad V_1 = \frac{4}{4 \times 3} = \frac{1}{3}$$

$$V_x \approx 0.333 = 4V_1$$

$$\frac{4 \times 4}{4 \times 3} + 4 + i_{test} = 0$$

$$i_{test} = - \frac{14 + 2 \times 1}{4 \times 3} \approx -1.039$$

V_{test} بر حسب
 i_{test} قابل محاسب است



$$\text{KCL}_{V_1} = 1 + \frac{V_1 - V_r}{1} - 1 = 0 \Rightarrow V_1 - V_r = 14$$

$$\text{KCL}_{V_r} = -1 + 1 + \frac{V_r - V_1}{1} + \frac{V_r}{1} = 0$$

$$1 + V_r - 1V_r + V_r = 0$$

$$4V_r + 1 = 1V_r$$

$$\frac{V_r}{1} + \frac{V_r - V_1}{1} + \frac{V_r - V_r}{1} = 0$$

$$\text{KCL}_{V_r} = \frac{V_r}{1} + \frac{V_r - V_1}{1} + \frac{V_r - V_r}{1} = 0$$

or $\frac{V_r}{1} + \frac{V_r - V_1}{1} + \frac{V_r - V_r}{1} = 0$

$$\left. \begin{array}{l} V_r = 1V_r + 14 \\ V_1 = V_r + 14 \end{array} \right\} 4V_r = 1V_r + 14$$

$$V_r = \frac{4V_r}{1} + 1$$

$$\frac{4V_r}{1} + 1 = 1V_r + 14$$

$$\frac{4V_r}{1} + 1 = 1V_r + 14$$

$$\frac{4}{1} V_r = 13$$

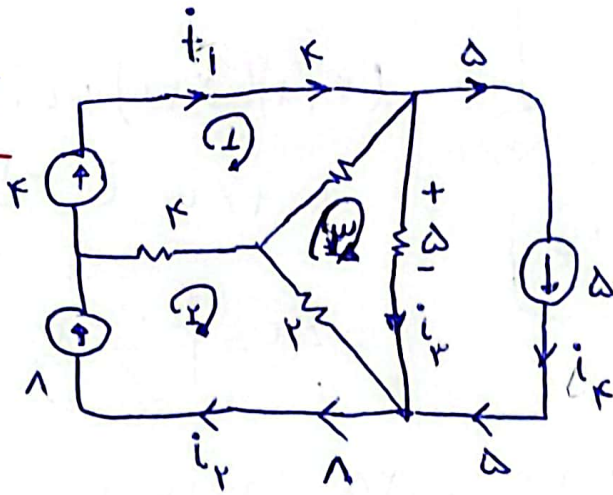
$$V_r = \frac{13}{4} = \frac{3.25}{1}$$

$$V_r = \frac{13}{1}$$

$$V_1 = \frac{13 + 1 \times 14}{1} = \frac{27}{1}$$

K

تکلیف مس



KVL (1)

$i_1 = i_2 = 1 \quad i_3 = 1 \quad i_4 = 2 \quad i_5 = ?$

$$(1)(i_3 - i_2) + (1)(-i_1 + i_2) + 2(i_4 - i_5) = 0$$

$$1i_3 - 1i_2 + i_2 - 1 + 2i_4 - 2i_5 = 0$$

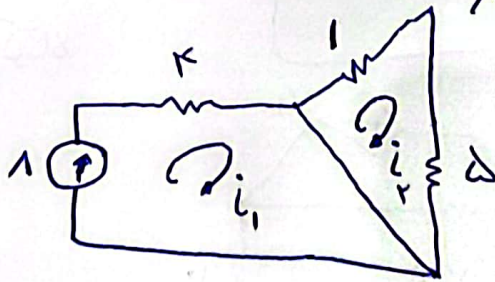
$$1i_3 = 1i_2 + 1 - 2i_4 + 2i_5$$

$$i_3 = \frac{1}{1}$$

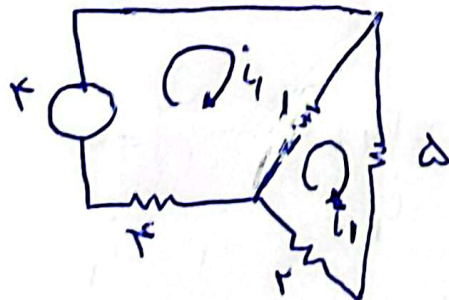
$$V = (2)(i_4 - i_5) = (2 \times 2 - 2) \times 2 =$$

$$\frac{2 \times 2}{1} V$$

جواب



$$i_1 = 1$$



$$1i_2 + 2i_3 + 1(i_2 - i_1) = 0$$

$$4i_2 + 1(i_2 - 1) = 0$$

$$5i_2 = 1 - i_2 \quad 1 = 6i_2$$

$$i_2 = \frac{1}{6} A$$

$$i_1 = 1$$

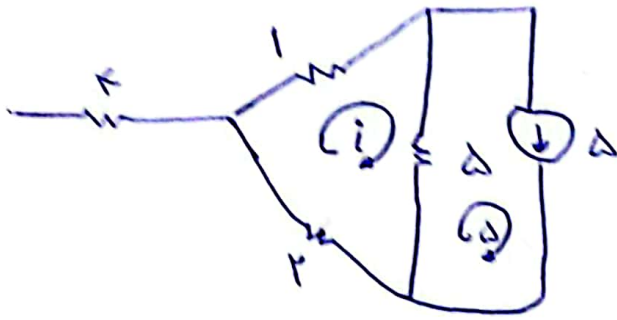
$$1(i_2 - i_1) + 2i_3 + 1i_2 = 0$$

$$2i_2 + i_2 = i_1$$

$$i_2 = \frac{i_1}{3} = \frac{1}{3} A$$

$$V = \frac{2}{3} V$$

$$V = 2i_2 = 1.0 V$$

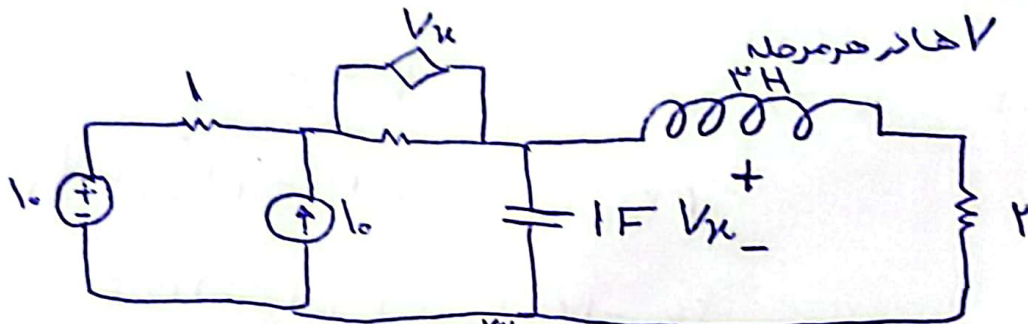


$$(2+1)(\Delta+i) + \Delta i = 0$$

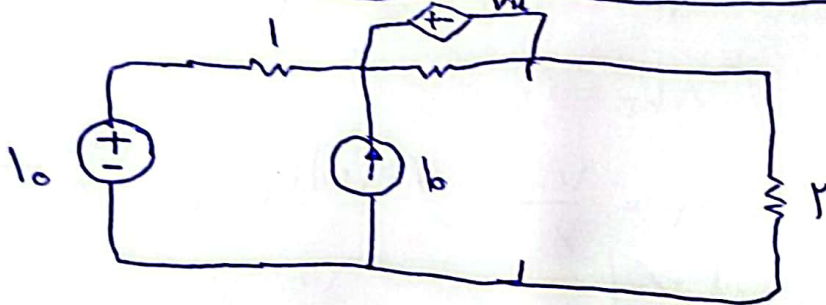
$$1\Delta + 1i \quad i = -\frac{1\Delta}{1}$$

$$V = \Delta i = \boxed{-\frac{V\Delta}{1} V}$$

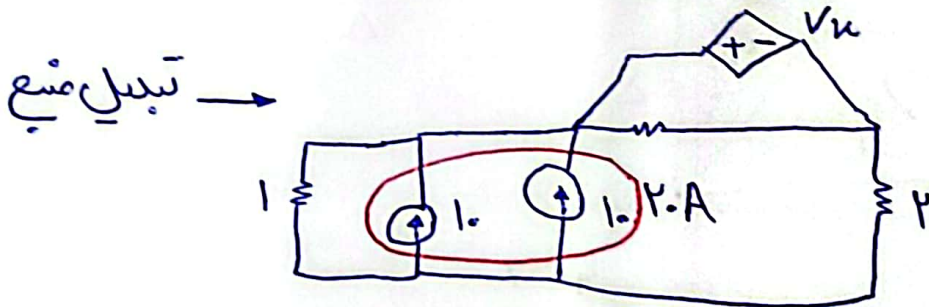
$$-\frac{V\Delta}{1} + 10 + \frac{\Delta}{2} = \frac{\Delta + 20}{1} = \frac{2\Delta}{1} = \underline{31.125V}$$



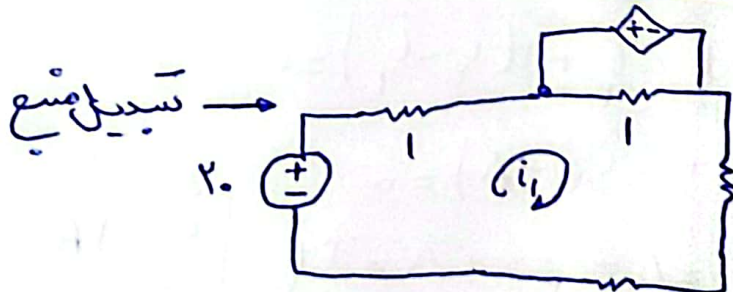
صالت مائدار



خاف : مدار باز
سلف : اتصال کوتاه



منابع VDC



$$-20 + i_1 + 2i_2 + (i_1 - i_2) = 0$$

$$+V_{x1} + i_2 - i_1 = 0 \quad i_2 = -i_1$$

$$V_{x1} = 2i_1$$

$$2i_1 + 2i_1 + i_1 = 20$$

$$4 = i_1$$

$$i_2 = -4$$

جهت عوض بدير
V i2

$$i = 4A \quad \text{جريان سلف محظوظ}$$

$$2 \times 4 = 8V \quad \text{ولتاژ خازن هفت ولتاژ 2\Omega}$$